

REMARKS

This is in response to the Office Action dated January 16, 2003. Examiner's allowance of claims 23-28, 30-35, and 48-52 is noted with appreciation. Applicants also wish to express their appreciation for Examiner indicating that certain other claims, i.e. 3-5, 8-11, 13-15, 18, 20, 21, and 39-45 would be allowed if rewritten in independent form including all of the limitations of the base claim and any intervening claims. This has been done in the present amendment. Accordingly, all the claims listed in this paragraph are believed to be allowed and therefore require no additional comments.

Claims 1, 2, 6, 7, 12, 16, 17, 19, 22, 29, 36-38, 46 and 47 were rejected. Claims 1, 2, 12, and 36-38 have been canceled. Claims 6 and 7 have been amended to depend from claim 3; which was indicated as being allowable. For this reason, claims 6 and 7 are believed to be allowable for the same reasons and also because they recite additional features of the invention. Claims 16 and 17 have been amended to depend from claim 13; which was indicated as being allowable. For this reason, claims 16 and 17 are believed allowable for the same reasons and also because they recite additional features of the invention. Claim 19 has been amended to depend from Claim 8; which was indicated as being allowable. Claim 19 was also rejected under 35USC112 because of a lack of antecedent basis for "the substrate". This rejection is also believed to be overcome by this amendment. Accordingly, claim 19 is believed to be allowable. Claim 22 has been amended to depend from claim 3; which was indicated as being allowable. Therefore, claim 22 is believed to be allowable for the same reasons as claim 3 and also because it recites additional features of the invention. Claim 29 has been amended to depend from claim 28; which was allowed. Claim 29 was rejected under 35USC112 because of a lack of antecedent basis for "the photodetector". This rejection is believed to be overcome by this amendment. Accordingly, claim 29 is believed to be allowable. Claims 46 and 47 have been amended to depend from claim 42; which was indicated as being allowable if rewritten as proposed by Examiner. Accordingly Claims 46 and 47 are now believed to be allowable for the same reasons and that they recite additional limitations. In short, all 52 original claims that remain in

this application (i.e. other than canceled claims 1, 2, 12, and 36-38) are believed to be in condition for allowance.

Applicants have added claims 53-92. These new claims succinctly describe Applicants' invention and are believed to be of a scope that defines the invention as being patentable both in the sense of 35USC102 and 35USC103. Claims 53-57 are similar to allowed claims 48-52. The distinction is that: "a photonics component flip-chip" has been replaced with – an optoelectronic component--. It appears that Applicants invention is entitled to a claim scope that should not be limited to flip-chip mounting. These claims are believed to be allowable for the same reasons as claims 48-52 have been allowed.

New claim 58 recites the method of the invention comprising the steps of creating electrical connectors, placing a waveguide adjacent and parallel to at least a portion of the electrical connectors, and encapsulating at least a portion of the electrical connectors and at least a portion of the waveguide, thereby maintaining said at least portion of electrical connectors and the waveguide in a fixed space relationship. None of the cited references teach such a structure, as is illustrated for example in Applicants' FIG. 1. The cited Swirhun patent shows a fiber ribbon 135 in a holder 150 (Figs. 1a and 1b). However, no electrical connectors are shown adjacent and parallel to at least a portion of the fiber ribbon 135. Moreover, Swirhun does not teach the step of encapsulating (the non-existent connectors). Examiner at paragraph 5 of the Office Action stated that Swirhun et al. discloses, as in claim 12, an optical coupler (Figures 1a and 1b) comprising: a waveguide (Figures 1a and 1b, 131); an encapsulant (Figures 1a and 1b, 130) surrounding at least a portion of the waveguide, etc. However item 130 is not an encapsulant but rather a surface (see col.4 lines 10, 14 and 17) of holder 150. Holder 150 is not described as being an encapsulant. Thus, since there is no encapsulant, *a fortiori*, the step of encapsulating is not taught and the resultant: thereby maintaining said at least portion of electrical connectors and the waveguide in a fixed space relationship is not even contemplated.

New claim 58 also distinguishes over the Henson reference for the same reasons. That is, Henson discloses neither the claimed spatial relationship nor the encapsulation. Examiner at page 3 of the Office Action stated that: Henson et al discloses, as in claim 36, a method of forming an optical coupler (Figures 1 and 3), the method comprising the steps of creating electrical connectors (Figure 3, 94); attaching a waveguide to the electrical connectors (Figure 1, 38); and encapsulating (Figures 1 and 3, 14) at least a portion of the electrical connectors and at least a portion of the waveguide. However, item 14 in Figure 1 is not an encapsulant but rather a frame, see for example column 4 lines 46, 64 and 68. Frame 14 is not described as an encapsulant. Thus, the step of encapsulation is not taught. Moreover, the connectors are remote from the fiber and not in the spatial relationship claimed by Applicants. Accordingly, the problem addressed and solved by Applicants' invention is not suggested by Henson.

Moreover, Henson teaches that plug 16 (holding optical fibers 14) may be constructed of any durable material preferably an injection-molded polymer such as polyester liquid crystal polymer. (Col.3, lines 59-61) This shows an awareness of injection molding in general that Henson did not envision for his invention. In contradistinction to encapsulating the fibers 14 in plug 16, plug 16 is assembled in multiple parts as shown in FIGS. 7 and 8. Rather than suggest the step of encapsulation, Henson teaches away from Applicants' step of encapsulating by describing a multi-part assembly of plug 16.

For the reasons set forth hereinabove, claim 58 is believed to be allowable. Claims 59 to 69 depend either directly or indirectly from claim 58 and are believed to be allowable for the same reasons and that they recite additional features of the invention. Additional features comprise: forming guides (claim 59), bending a portion of a conductive plate (claim 60), providing a lead frame and bending the leads (claim 61), patterning a surface of a plate of conductive material...(claim 62), polishing an end of a waveguide (claim 63), singulating (claim 64), coating an end.....(claim 65), attaching a conductive tape (claim 66), plating a conductive material (claim 67) attaching guides (claim 68), and forming a ground plane (claim 69).

Claim 70 recites the optical coupler of the invention comprising: an electrical connector, an optical transmission medium disposed proximate the electrical connector and an encapsulant surrounding at least a portion of the connector and at least a portion of the transmission medium, thereby maintaining the electrical connector and the optical transmission medium in a fixed space relationship. As previously noted, neither reference of record teaches encapsulating connectors and waveguides to maintain them in a fixed space relationship. In fact, even the "frames" and "holders" (not encapsulants) as described in Henson and Swirhun, respectively, hold only the fibers and not conductors. Accordingly, claim 70 is believed to be allowable.

Claim 71 recites an optical coupler for coupling an optoelectronic device to an optical fiber having a first core diameter, comprising: an electrical connector, an optical transmission medium comprising fused optical fibers having a core diameter less than the first core diameter and disposed proximate the electrical connector, and an encapsulant surrounding at least a portion of the connector and at least a portion of the transmission medium. The cited references show an optical fiber having a first core diameter but do not show an optical transmission medium comprising fused optical fibers having a smaller core diameter and encapsulated as claimed. Claim 71 is therefore believed to be allowable. Claims 72-80 depend in various degrees from claim 71 and are believed to be allowable for the same reasons and because they recite additional features. For example, claim 72 recites that each of the fused optical fibers have a core diameter smaller than about 50 microns. Claim 73 recites the direction of current flow. Claim 74 recites silica-filled epoxy material. Claim 75 recites guides configured to receive guide pins attached to fiber ribbon. Claim 76 recites a ground plane. Claim 77 recites die attachment material. Claim 78 recites a conductive tape. Claim 79 recites a conductive plug and claim 80 recites a plurality of conductive plugs.

New claim 81 recites the optical coupler of the invention comprising: an electrical connector, an optical transmission medium juxtaposed with the electrical connector, an optical path of the optical transmission medium being parallel to and coextensive with at least a portion of the electrical connector, and an optoelectronic device attached to said

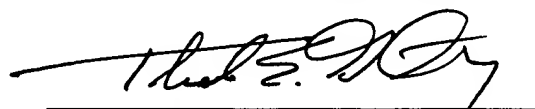
electrical connector transverse the optical path and adjacent one end of the optical transmission medium. As previously noted, the cited references do not teach or suggest electrical connectors and an optical transmission medium juxtaposed parallel to at least a portion of the electrical connector and an optoelectronic device attached transversely (as claimed in claim 81). As illustrated, for example, in Applicants' Fig. 1, such a structure was not known in the prior art. Claims 82-85, and claim 92 depend in various degrees from claim 81 and are believed to be allowable for the same reasons.

New claim 86 recites the optical coupler of the invention comprising: an electrical connector, an optical transmission medium attached to the electrical connector with the optical path of the optical transmission medium being parallel to at least a portion of the electrical connector such that a surface portion of said electrical connector and an end surface of the optical transmission medium form a substantially coplanar surface, and an optoelectronic device attached to the surface portion of said electrical connector and adjacent the optical transmission medium at said coplanar surface. As noted hereinabove, none of the references show an optical transmission medium attached in parallel to at least a portion of an electrical connector. Note that in Applicants' invention, as shown for example in FIG. 1, a surface portion of the connector and a surface portion of the optical transmission medium are coplanar, a feature not found in the prior art. The optoelectronic device is then attached to the previously unknown assembly of optical transmission medium and connector, resulting in the overall novel and unobvious structure of claim 86.

Claims 87-91 depend in various degrees on claim 86 and are believed allowable for the same reasons and that they recite additional features. Thus, claim 87 specifically recites a vertical cavity surface emitting laser. Claim 88 recites the optically transparent gel, further described as matched to the index of refraction in claim 89. Claim 90 recites the alignment guide disposed longitudinally in parallel with the optical path. Lastly, claim 91 recites that the optoelectronic device is a photo detector. These added features contribute to patentability in the overall combination.

In view of the foregoing, it is believed that all the claims currently in this application are in condition for allowance. If Examiner has a question or comment or if Applicants' attorney can assist in any manner whatsoever, Examiner is respectfully requested to telephone the undersigned. An early notification of allowance is earnestly solicited.

Respectfully submitted,
Suresh Golwalkar et al



Attorney for Applicants
Theodore E. Galanthay
Attorney Reg. No, 24,122

From: Primarion, Inc.
2507 W. Geneva Drive
Tempe, Arizona 85282

Telephone: 480-575-0744

TEG/cw